

SETTLEMENT COMMUNICATION / FRE 408

February 27, 2023

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**Re: EPA FOV # EPA-5-23-OH-02 issued to BP-Husky Refining LLC
Response to EPA's Requests Following the January 25, 2023, FOV Conference**

Dear Virginia:

On January 25, 2023, representatives of the BP-Husky Toledo Refinery ("Refinery") met with you and other representatives of the United States Environmental Protection Agency ("EPA"), Region 5, to discuss the Finding of Violation ("FOV") referenced above that EPA sent to the Refinery on December 21, 2022. EPA requested information from EPA during the conference, and in subsequent e-mails. The Refinery committed to responding to EPA's requests by the end of February.

Each of EPA's requests are described below and are followed by the Refinery's narrative response. Responsive documents have been uploaded to the sharefile site that EPA provided. The Refinery assembled these responses in good faith. The responses are grounded in the Refinery's understanding of the questions posed by EPA and the information that was reasonably available to the Refinery at the time that it prepared these responses.

1. FOV Presentation

Response:

A copy of the PowerPoint presentation the Refinery presented during the meeting on January 25, 2023, was emailed to Virginia Galinsky on February 6, 2022.

2. Documentation showing that that flow meters have met accuracy requirements.

Response:

The Refinery has attached internal data sheets for each new flow meter. The Refinery has also attached the manufacturer's accuracy reports for each flow meter. These documents identify the accuracy range for maximum, normal, and minimum flow rates for each flow meter. These documents are uploaded as Attachment A.

3. Updated version of flare management plan.

Response:

As the Refinery discussed with EPA during the FOV conference, the Flare Management Plan ("FMP") has been updated to include the newly installed flow meters, control logic used for compliance, and new alternative baselines. The revised FMP was submitted to

refinerynsps@epa.gov and refineryRTR@epa.gov via email on February 24, 2023. The revised FMP is uploaded as Attachment B.

4. Data comparing flow meter values from the FCCU.

Response:

As the Refinery discussed with EPA during the FOV conference, the Refinery's main FCCU Air Blower flow meter (FRC301) was installed in the 1950s. During the FCCU cycle ending turnaround in 2022, a secondary FCCU Air Blower thermal mass flow meter (FI 7315) was installed. The FCCU started up and was out of turnaround conditions on August 8, 2022. The Refinery is providing data comparing the two flow meters in Thousand Standard Cubic Feet per Minute ("MSCFM") for both flow meters. This data is uploaded as Attachment C. The data includes the daily average flow from the date that the FCCU was out of turnaround conditions through the shutdown of the FCCU and all other process units following the fire on September 20, 2022. In addition, the Refinery has enclosed the instrument data sheet for FI 7315. The data sheet and manufacturers accuracy report can be found in Attachment A.

5. Verification if six supplemental gas flow meters were reading higher or lower than 5%.

Response:

Differential pressure ("dP") based flow devices calculate a flow by measuring the differential pressure created by a primary element in the pipe. The primary elements for the six natural gas flow meters replaced at the Refinery were orifice plates. There are two parts to a dP flow meter: the primary element (orifice plate) and the transmitter that measures the differential pressure and converts it into a flowrate. Depending upon the BTU/scf of the waste gas and the steam flow, use of supplemental gas can vary greatly.

Due to the variability of the flow, temperature, and pressure, the Refinery is unable to accurately determine if the six supplemental gas flow meters ("NG") were consistently reading higher or lower than 5%. During operating scenarios involving average flow, temperature, and pressure, the Refinery expects that these flowmeters were reading within 5% accuracy. However, during high flow, high temperature, and high-pressure operating scenarios, the flow meters may have been reading outside the 5% accuracy requirement. They may also have been reading outside the 5% accuracy requirement at low flow rates because orifice plates are inherently and increasingly less accurate as flow rates decrease.

The flow meter evaluation took into consideration the entire flow range of the NG system, as well as maximum temperature and pressure operating conditions. Sizing calculations for the orifice plate showed that the primary element could not be re-ranged to read the entire flow range, which included maximum temperature and pressure operating conditions, which the system can pass.

6. Timeline of internal assessment of MACT CC requirements.

Response:

The Refinery prepared a timeline addressing the Refinery's assessment and correction of MACT CC flow meter issues and it is uploaded as Attachment D.

7. Dates of potential NHVcz violations.

Response:

Potential NHVcz deviations were reported in the 2Q2020 Title V deviation report dated July 30, 2020, which identified periods when net heating value fell below 270 BTU/scf during a flaring event. These periods were:

- 4/24/2020 at 13:15 hours to 4/24/2020 at 13:30 hours
- 5/4/2020 at 18:30 hour to 5/4/2020 at 19:00 hours

As reported, both deviations note that the flow meter appeared not to be reading correctly. Attachment E contains a copy of the relevant deviations that the Refinery reported in its 2Q2020 Title V deviation report.

Both flow meters measure waste gas slipstreams. FI3902C measures waste gas flow from the TIU treated fuel gas mix drum, which is combusted in the West Flare. FI1736 measures waste gas flow from the 3rd party hydrogen plant, which is combusted in the East Flare.

Each of these waste gas streams has a net heating value greater than 270 BTU/scf. The waste gas from the hydrogen plant is pure hydrogen and has a BTU value of 1,212 BTU/scf. The waste gas from the TIU treated fuel gas mix drum trends around 1,000 BTU/scf but is always well above 270 BTU/scf.

As the Refinery discussed with EPA during the FOV conference, the Refinery began assessing the flow meters in 2Q2020 due to no flow being measured by FI3902C & FI1736 during low flow events when the Refinery was flaring. Once the Refinery understood that these flow meters were not measuring low flow during flaring events that occurred during low flow, the Refinery was able to reset the low flow cut-off points of these meters in May 2020. This allowed the Refinery to obtain flow readings when the valve was open at low flows during flaring events. Once the low flow cut off points were adjusted, it became clear that these meters were not accurate at low flow rates.

Since FI1736B was installed on the 3rd party hydrogen line in December 2022, the Refinery is measuring low flows accurately whereas, prior to the installation of FI1736B, typically no flow was being measured by FI1736 during low flow flaring events.

Per 40 CFR § 63.670(m), net heating value is calculated using the following equation:

$$NHV_{cz} = \frac{Q_{vg} \times NHV_{vg}}{(Q_{vg} + Q_s + Q_{a,premix})}$$

Where:

NHV_{cz} = Net heating value of combustion zone gas, Btu/scf.

NHV_{vg} = Net heating value of flare vent gas for the 15-minute block period, Btu/scf.

Q_{vg} = Cumulative volumetric flow of flare vent gas during the 15-minute block period, scf.

Q_s = Cumulative volumetric flow of total steam during the 15-minute block period, scf.

$Q_{a,premix}$ = Cumulative volumetric flow of premix assist air during the 15-minute block period, scf.

Adding flows with high net heating values increases the NHVcz 15-minute block period value. Thus, even though the contribution to the net heating value for these two streams were not being captured accurately, it should not have resulted in 15-minute block periods below the 270 BTU/scf standard for the two deviations reported in 2Q2020.

As the Refinery explained in its response to Request 5, it is not able to determine if the six natural gas flow meters in question were consistently reading higher or lower flows. Therefore, the Refinery is unable to determine if there are other periods where the NHVcz may have fallen below the 270 BTU/scf standard. In order to attempt to respond to this portion of EPA's request, the Refinery would need to undertake a detailed and time-consuming analysis involving a large number of assumptions that is unlikely to yield an accurate result.

8. Results of investigation on what caused moisture in fenceline monitoring samples.

Response: The Refinery uploaded this information to EPA's sharefile link on February 10, 2023.

9. Results of investigation into high benzene concentration at fenceline monitor locations 6 and 12.

Response: The Refinery uploaded this information to EPA's sharefile link on February 10, 2023.

Please contact me should you have any questions concerning these narrative responses or the documents and data that the Refinery has uploaded to EPA's sharefile site.

Sincerely,

DocuSigned by:

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Jennifer Roberts

Environmental, Social and Carbon Superintendent